Appl. No. 10/812,537
Amdt. dated April 21, 2006
Reply to Office Action of December 27, 2005

PATENT

REMARKS/ARGUMENTS

Claims 1-20 are pending. Claims 1 and 18 have been amended. New claims 19 and 20 have been added. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Applicants note with appreciation the indicated allowability of claims 3, 4, 13, and 14 if rewritten in independent form. The claims have not be rewritten at this time because Applicants believe the claims as presented are allowable.

Claims 1, 2, 5-12, and 15-18 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Miki et al. (US 2004/0226021). Claims 16 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Miki et al.

Claims 1-4

Applicants respectfully submit that independent claim 1 as amended is novel and patentable over Miki et al. because, for instance, Miki et al. does not teach or suggest a first storage subsystem which includes a first storage volume and a controller, wherein the controller is configured to receive I/O requests to the first storage volume and to a second storage volume as a virtual volume, the second storage volume being configured with at least one of second storage devices in a second storage subsystem coupled to the first storage subsystem.

The present invention is directed to storage virtualization. As claimed, the controller of the first storage subsystem receives I/O requests to the first storage volume of the first storage subsystem. In addition, the controller also receives I/O requests to the second storage volume as a virtual volume, the second storage volume being configured with at least one of second storage devices in the second storage subsystem. In this way, I/O requests to the first storage volume and the second storage volume from a host computer, which is connected to the first storage subsystem, are conducted through the first storage subsystem. Moreover, the external device, which is connected to the first storage subsystem, does not need to issue a request to the second storage subsystem directly. Instead, the controller of the first storage subsystem will issue the request to the second storage subsystem, such as a lock request to change an attribute of the second storage volume to write

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protect state. Therefore, the controller of the first storage subsystem manages the second storage volume of the second storage subsystem as a virtual volume.

Miki et al. does not disclose storage virtualization. Instead, Miki et al. is directed to remote copy. Miki et al. discloses a technique to propagate attributes which are set to the source volume in the first storage system to its corresponding destination volume in the second storage system, and vice versa. The source volume in the first storage system can be seen and accessed by the first host computer which is connected to the first storage system, whereas the destination volume can be seen and accessed by the second host computer which is connected to the second storage system. The access to the source volume from the first host computer is managed by the first storage system, whereas the access to the destination volume from the second host system is managed by the second storage system, respectively. In Miki et al., the first storage device does not include a controller that manages the storage volume in the second storage system as a virtual volume.

For at least the foregoing reasons, claim 1 and claims 2-4 depending therefrom are novel and patentable over Miki et al.

Claims 5-15

Applicants respectfully submit that independent claim 5 is novel and patentable over Miki et al. because, for instance, Miki et al. does not teach or suggest presenting a plurality of storage volumes to a host via a first storage subsystem, the plurality of storage volumes including a first storage volume that maps to a storage area within the first storage subsystem and a second storage volume that maps to a storage area within a second storage subsystem that is different from the first storage subsystem. Nor does Miki et al. disclose or suggest sending a second request from the first storage subsystem to the second storage subsystem if the target volume is determined to be the second storage volume, the second request being a request to modify the attribute of the target volume.

As discussed above, the present invention disclose storage virtualization. The storage volumes presented to the host via the first storage subsystem include not only a first storage volume that maps to a storage area within the first storage subsystem, but also a second storage volume that maps to a storage area within a second storage subsystem. The presentation of the second storage volume to the host via the first storage subsystem is a form

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of storage virtualization. Miki et al. does <u>not</u> present a storage volume of the second storage system to the first host <u>via the first storage system</u>.

When a request is received to modify the attribute of a target volume in the second storage subsystem, the second storage subsystem sends a request to the second storage subsystem to modify the attribute of the target volume in the second storage subsystem. The first storage subsystem manages the storage volume in the second storage subsystem. Miki et al. does <u>not</u> disclose or suggest such a feature.

For at least the foregoing reasons, claim 5 and claims 6-15 depending therefrom are novel and patentable over Miki et al.

Claims 16-17

Applicants respectfully submit that independent claim 16 is novel and patentable over Miki et al. because, for instance, Miki et al. does not teach or suggest code for presenting a plurality of storage volumes to a host via a first storage subsystem, the plurality of storage volumes including a first storage volume that maps to a storage area within the first storage subsystem and a second storage volume that maps to a storage area within a second storage subsystem that is different from the first storage subsystem. Nor does Miki et al. disclose or suggest code for sending a second request from the first storage subsystem to the second storage subsystem if the target volume is determined to be the second storage volume, the second request being a request to modify the attribute of the target volume.

As discussed above in connection with claim 5, Miki et al. does <u>not</u> teach or suggest presenting a storage volume of the second storage system to the first host via the first storage system, or a first storage subsystem that manages the storage volume in the second storage subsystem. The presentation of the second storage volume to the host via the first storage subsystem is a form of storage virtualization.

Moreover, Miki et al. and the present application were, at the time of invention, owned and subjected to assignment to Hitachi. Miki et al. qualifies as prior art under 35 U.S.C. § 102(e). Therefore, Miki et al. does not qualify as prior art for rejection under 35 U.S.C. § 103(a).

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Claims 18-20

Applicants respectfully submit that independent claim 18 as amended is novel and patentable over Miki et al. because, for instance, Miki et al. does not teach or suggest a first storage subsystem which includes a first storage volume and a controller, wherein the controller is configured to manage the first storage volume and to manage a second storage volume configured with at least one of second storage devices in the second storage subsystem as the at least one virtual volume.

As discussed above in connection with claim 1, Miki et al. does not disclose storage virtualization. Instead, Miki et al. is directed to remote copy. In Miki et al., the first storage device does not include a controller that manages the storage volume in the second storage system as a virtual volume.

For at least the foregoing reasons, claim 18 and claims 19-20 depending therefrom are novel and patentable over Miki et al.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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